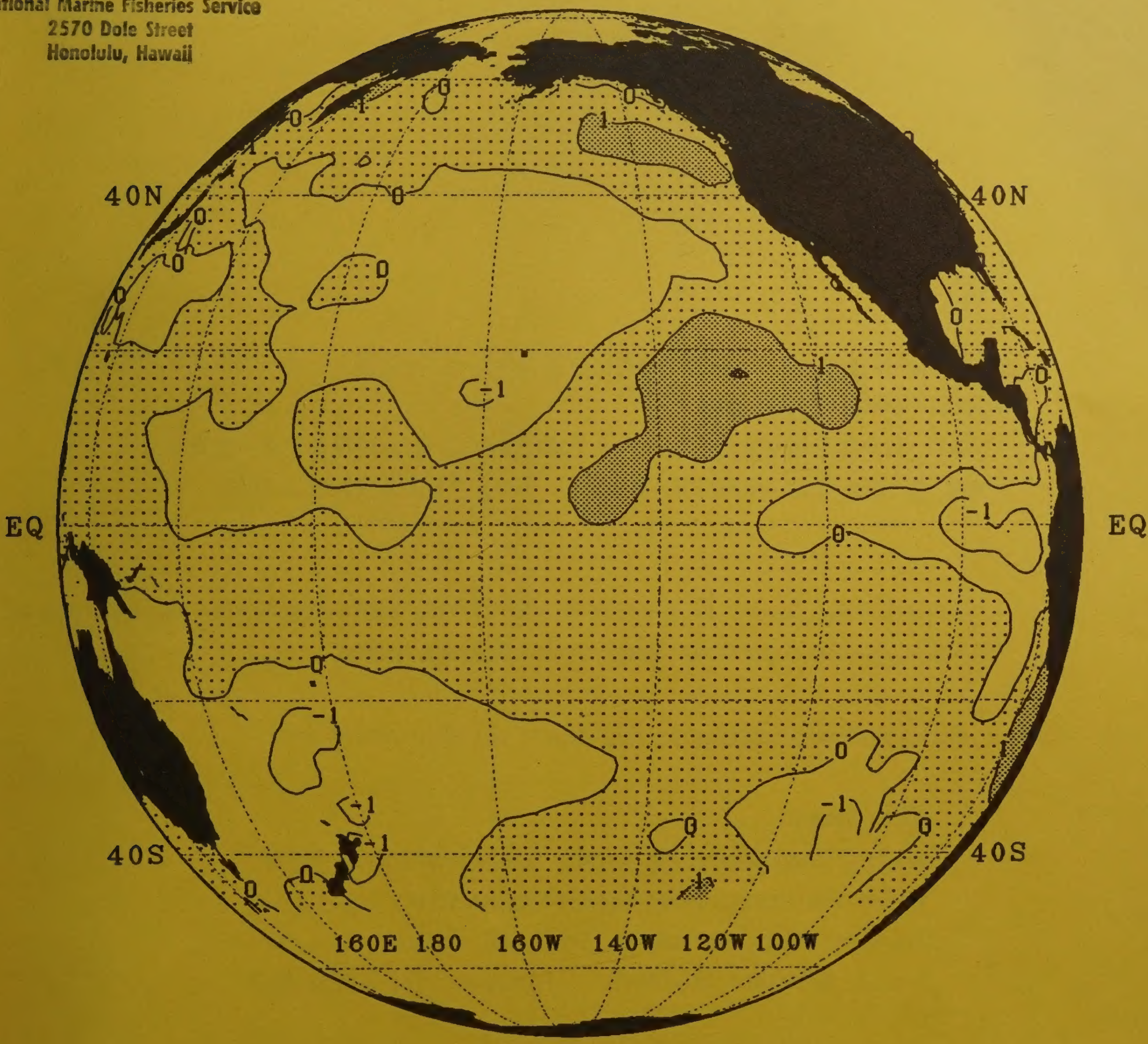
気　象　庁　海　洋　月　報

Monthly Ocean Report

April 1994 (No. 16)



El Niño Monitoring Center
Japan Meteorological Agency

気象庁海洋気象部海洋課
エルニーニョ監視センター

平成6年4月

気象庁海洋月報は、気象庁海洋気象部海洋課エルニーニョ監視センターで作成されています。
本月報に関する問い合わせは、

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Monthly Ocean Report is prepared by the El Niño Monitoring Center, Oceanographical Division, Marine Department, Japan Meteorological Agency.

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表紙は1994年４月の太平洋の月平均海面水温偏差図です。
陰影部は平年より高温の海域を示しています。

The figure on the front cover shows the monthly mean SST anomalies for April 1994 in the Pacific Ocean.
Areas of positive anomalies are shaded.

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海況の特徴（１９９４年４月）

太平洋の海況

太平洋赤道域の海面水温は、ペルーの沖合で平年より１℃以上低かったほかは、全般に平年並であった。エルニーニョ監視海域（4°Ｓ～4°Ｎ、150°Ｗ～90°Ｗ）の海面水温偏差は、-0.1℃だった（第１表、第１図、第６図）。

赤道域の表層混合層は、西部では28℃以上の暖水層が厚くなる傾向が続いていた（第９図）。

北太平洋では、15～40°Ｎの170°Ｅから140°Ｗにかけて平年より低かった。カリフォルニア半島沖及びアラスカ湾沖では平年より１℃以上高い状態が続いていた（第１図）。

日本近海の海況

日本近海の海面水温は、三陸沖及び九州西方を除き、平年より高かった。（第17図）。

黒潮は九州の南東沖で蛇行し、四国に接岸して流れた後、紀伊半島沖から33°Ｎに沿って東に流れ、八丈島付近を通って房総半島沖を東に流れていた（第20図）。

本州東方の親潮系の冷水（深さ100ｍで５℃以下）の沿岸寄りの分枝は36.8°Ｎ・142.9°Ｅまで、沖合の分枝は38.8°Ｎ・146.4°Ｅまで、それぞれ達していた（第19図）。

熱帯の気象

太平洋の赤道域では、対流圏の上層、下層とも東風偏差となった。また、対流活動は、太平洋の西部から中部にかけて全体に平年より活発だった。南半球では、対流圏下層の高度場で見ると、東部太平洋で負偏差、インド洋から西部太平洋にかけて正偏差となり、月平均海面気圧は、タヒチで負偏差、ダーウィンで正偏差となって南方振動指数（ＳＯＩ）は-2.1と大きな負の値となった（第１表、第12図、第13図）。

［気象庁長期予報課提供］

1993／1994年冬のオホーツク海の海氷分布をiiiページに紹介する。

［気象庁海上気象課提供］

HIGHLIGHTS April 1994

Pacific

Sea surface temperatures (SSTs) in the equatorial Pacific were near normal except off Peru where SSTs were more than 1°C below normal. The SST index for region B (refer to Fig. 6) was -0.1°C (Table 1 and Figs. 1, 6).

The thickness of surface warm water (warmer than 28°C) in the western equatorial Pacific continued to thicken (Fig. 9).

In the North Pacific Ocean, SSTs were below normal between 15°N and 40°N from 170°E to 140°W. SSTs off Baja California and off the Gulf of Alaska continued to be more than 1°C above normal (Fig. 1).

Seas adjacent to Japan

SSTs in the seas adjacent to Japan were above normal except off Sanriku and west of Kyushu (Fig. 17).

The Kuroshio meandered off southeast of Kyushu, then flowed along the south coast of Shikoku. It flowed eastward from Kii Peninsula along 33°N parallel, passing near Hachijo Island to the Boso Peninsula (Fig. 20).

The Oyashio cold water (colder than 5°C at a depth of 100m) extended southward to 36.8°N, 142.9°E and 38.8°N, 146.4°E, respectively (Fig. 19).

Atmospheric conditions in the tropics

Throughout the Pacific, low-level equatorial easterlies enhanced in April. Convective activities in the western and central Pacific were stronger than normal. In the southern hemisphere, the Southern Oscillation Index (SOI) was negative (-2.1) for the second consecutive month, consistent with positive low-level height anomalies dominated from the Indian Ocean to the western Pacific and negative anomalies observed in the eastern Pacific (Table 1 and Figs. 12, 13).

[prepared by the Long-range Forecast Division, JMA]

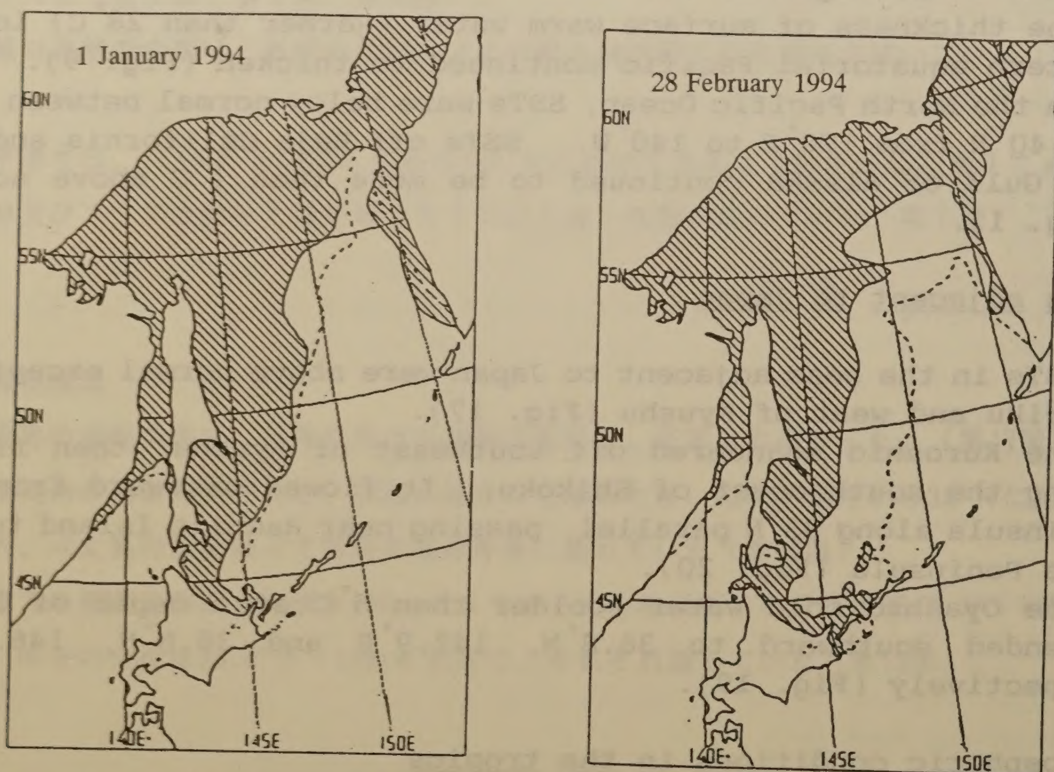
Sea ice distribution in the Sea of Okhotsk for the winter of 1993/1994 is shown in page iii.

[prepared by the Maritime Meteorological Division, JMA]

Sea ice distribution in the Sea of Okhotsk for the winter of 1993/1994

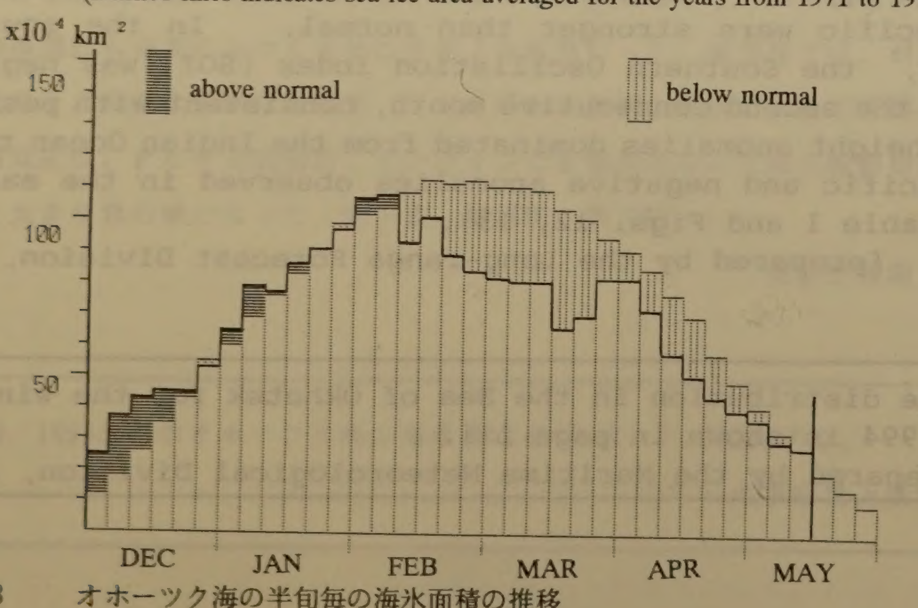
1993年から1994年にかけての冬季のオホーツク海の氷域の広がりは、12月から１月にかけてはほぼ平年並であったが、２月以降は平年に比べて狭く推移した。今冬の年間最大海氷面積は、過去24冬のうち最も早く２月10日に観測された。ここ６冬にわたり、オホーツク海では、年間最大海氷面積が平年以下となっている。また、２月から４月にかけては、しばしばオホーツク海から日本海北部及び千島列島沿いの太平洋に海氷の流出が見られた。

In the Sea of Okhotsk, distribution of sea ice for the winter of 1993/1994 was near-normal in December and January, while below normal from February onwards. The annual maximum extent of sea ice was observed on 10 February 1994, which is the earliest record for the past 24 winters. The last six consecutive winters recorded the annual maximum sea ice areas less than long-term mean (1971-1990). During the months from February to April, sea ice occasionally drifted out to the northern part of the Japan Sea and the seas adjacent to the Kurile Islands in the western North Pacific.



図－A　オホーツク海の海氷分布（1994年１月31日、２月28日）

Fig. A　Sea ice areas in the Sea of Okhotsk on 31 January and 28 February 1994
(Dashed lines indicates sea ice area averaged for the years from 1971 to 1990)



図－B　オホーツク海の半旬毎の海氷面積の推移

Fig. B　5-day mean sea ice areas in the Sea of Okhotsk for the winter of 1993/1994

El Niño monitoring indices

Date		1992		1993												1994		
		NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR
Pacific Sea Surface Temperature (℃)																			
D	(14N～ Eq.) (130E～150E)	29.0	28.7	28.0	28.0	28.2	28.6	28.8	29.2	29.1	28.9	29.1	29.1	29.5	29.1	28.4	28.5	28.6	29.1
		-0.2	-0.2	-0.5	-0.3	-0.2	-0.2	-0.3	-0.1	-0.1	-0.2	-0.1	-0.2	+0.3	+0.2	-0.1	+0.2	+0.2	+0.3
A	(4N～ 4S) (160E～150W)	28.7	28.8	28.5	28.4	28.4	28.7	29.0	29.1	29.1	28.8	29.1	28.8	28.9	28.7	28.2	28.0	28.2	28.4
		+0.3	+0.6	+0.5	+0.4	+0.3	+0.5	+0.5	+0.6	+0.6	+0.4	+0.8	+0.4	+0.5	+0.5	+0.2	0.0	+0.1	+0.2
B	(4N～ 4S) (150W～ 90W)	24.7	25.0	25.5	26.6	27.4	28.1	28.0	27.0	25.8	24.9	24.8	25.0	25.2	25.3	25.7	26.1	26.9	27.0
		+0.1	+0.1	+0.1	+0.4	+0.5	+1.0	+1.4	+0.9	+0.6	+0.3	+0.2	+0.4	+0.6	+0.4	+0.3	-0.1	0.0	-0.1
C	(Eq.～ 10S) (90W～ 80W)	21.2	22.5	24.3	26.1	27.0	26.4	25.2	23.3	22.1	21.0	20.8	21.3	21.5	22.8	24.7	26.0	25.3	24.2
		-0.3	-0.1	0.0	+0.4	+1.1	+1.3	+1.3	+0.6	+0.5	+0.4	+0.5	+0.6	0.0	+0.2	+0.4	+0.3	-0.6	-0.9
Pacific Sea Level Anomaly (cm)																			
YAP	(10N, 138E)	6	8	7	9	11	1	-2	-2	1	-1	5	8	8	10	7	7	6	
RABAUL	(4S, 152E)	-6	-6	-9	-10	-14	-12	-13	-11	-8	-9	-7	-6	-5	-2	-1	3	4	
MAJURO	(7N, 171E)	6	4	-1	-4	-4	-8	-1	6	5	3	1	5	2	3	2	2	3	
TARAWA	(1N, 173E)	2	4	1	7	10	3	5	6	4	7	4	6	2	1	6	-1	6	
CHRISTMAS	(2N, 157W)	4	1	5	4	8	6	5	-1	-2	-1	-1	-2	-1	-7	-3	-7	0	
SANTA CRUZ	(1S, 90W)	-1	-2	4	8	7	7	10	4	0	0	1	3	0	0	-1	0	-4	

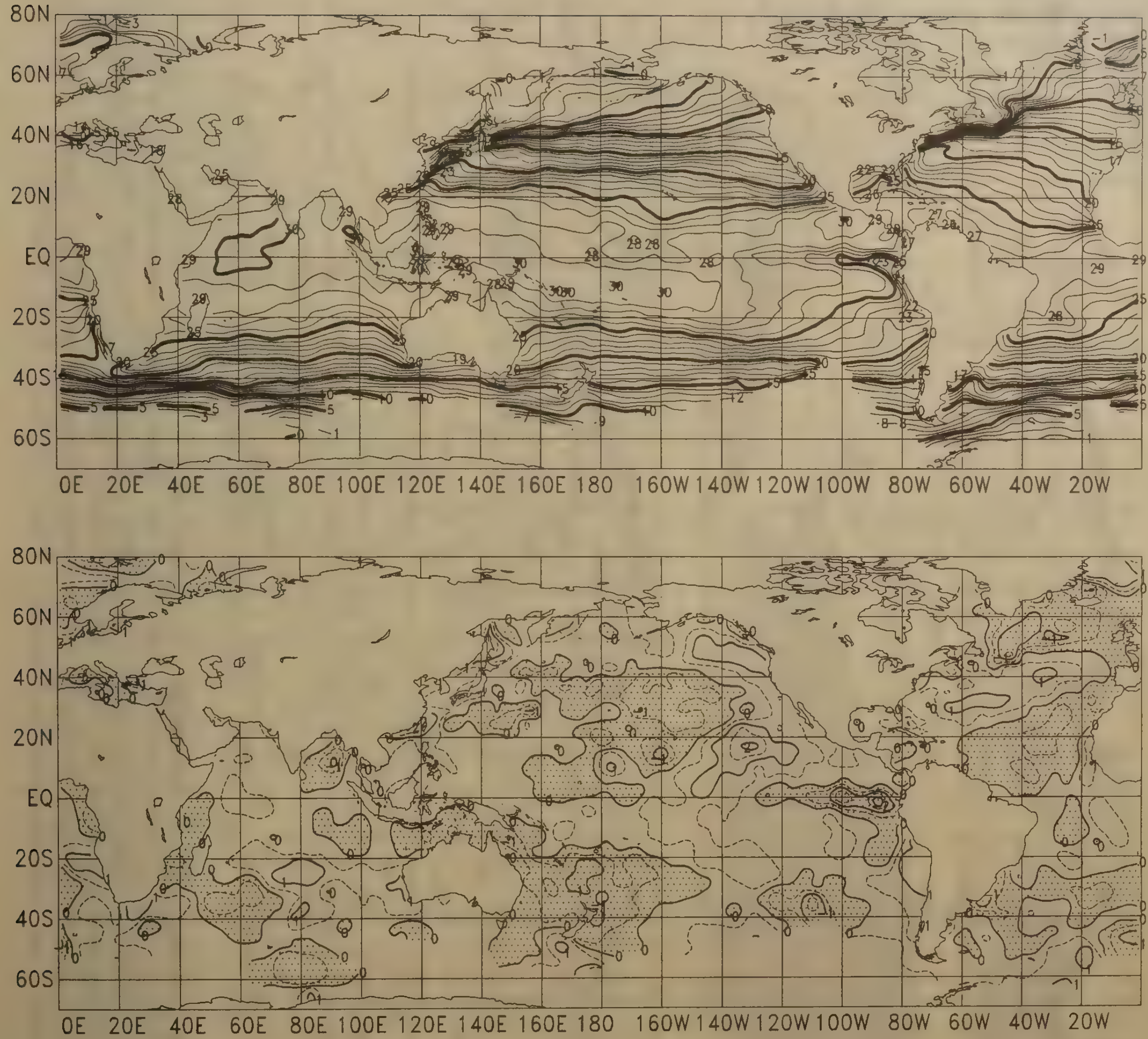
第１表（a）エルニーニョ監視指数

Table 1(a) El Niño monitoring indices. Data sources are the El Niño Monitoring Center, JMA for the sea surface temperature and the SOC of ISLP-PAC, Department of Oceanography, University of Hawaii for the sea level anomaly.

Date		1992	1993												1994				
		NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR
Southern Oscillation Index																			
SOI	(TAHITI-DARWIN)	-0.6	-0.5	-0.8	-0.6	-0.5	-1.9	-0.8	-1.6	-1.0	-1.5	-0.7	-1.4	-0.0	0.2	-0.2	0.1	-0.8	-2.1
TAHITI	(17.5S, 150W)	-0.5	-1.1	-1.4	-1.9	1.0	-0.7	0.2	-0.6	-1.1	0.0	-0.0	-0.9	0.1	-0.0	-0.1	0.0	-0.1	-1.5
DARWIN	(12.5S, 131E)	0.6	-0.2	0.4	-0.3	2.4	1.9	1.4	1.3	0.4	2.2	1.4	1.3	0.1	-0.5	0.3	-0.2	1.7	1.2
High Cloud Amount Index																			
HCLD-PH	(20N ~ 10N) (110E ~ 140E)	-1.7	-1.4	-1.0	-0.3	-0.4	-0.5	-2.2	-1.9	-0.5	-0.4	0.7	-0.1	-0.6	1.2	-0.5	-0.5	0.6	0.7
HCLD-MC	(5N ~ 5S) (110E ~ 135E)	-0.8	0.4	-1.1	-0.9	-1.1	0.3	-1.4	-2.1	-1.0	-1.4	-1.0	-1.5	-0.8	-0.2	-0.4	-0.5	0.8	0.4
HCLD-DL	(5N ~ 5S) (170E ~ 170W)	1.3	1.2	0.8	1.4	0.5	2.8	2.0	1.8	1.3	0.3	1.8	1.7	-0.2	0.0	0.0	-0.7	-0.6	0.4
Equatorial Zonal Wind Index																			
U200-IN	(5N ~ 5S) (80E ~ 100E)	0.1	0.1	-0.1	0.8	-0.9	-0.3	0.5	0.4	-0.3	-0.5	-2.1	-0.7	-0.8	-1.8	-0.4	-0.8	-1.5	-0.2
U200-CP	(5N ~ 5S) (180 ~ 125W)	-0.2	0.7	-0.3	-0.3	0.0	-0.6	-1.3	-0.0	1.1	0.3	-0.3	0.0	-0.5	0.4	0.4	0.8	0.2	-0.3
U850-WP	(5N ~ 5S) (160E ~ 175W)	0.4	0.8	0.3	0.9	0.3	0.8	0.5	0.3	0.1	0.7	-0.0	0.9	-0.4	-0.7	-1.2	-1.0	-0.6	-0.5
U850-CP	(5N ~ 5S) (170W ~ 135W)	0.9	0.2	0.2	0.0	-0.1	0.3	0.6	0.6	-0.8	0.1	0.2	0.4	0.3	-0.5	-0.6	-0.9	-0.2	-0.4
U850-EP	(5N ~ 5S) (130W ~ 100W)	1.9	-0.0	0.1	-0.1	0.2	0.5	0.9	0.7	-0.4	0.8	1.0	0.2	0.9	0.2	0.1	-0.4	0.1	-0.5

第１表（b）エルニーニョ監視指数(続き)

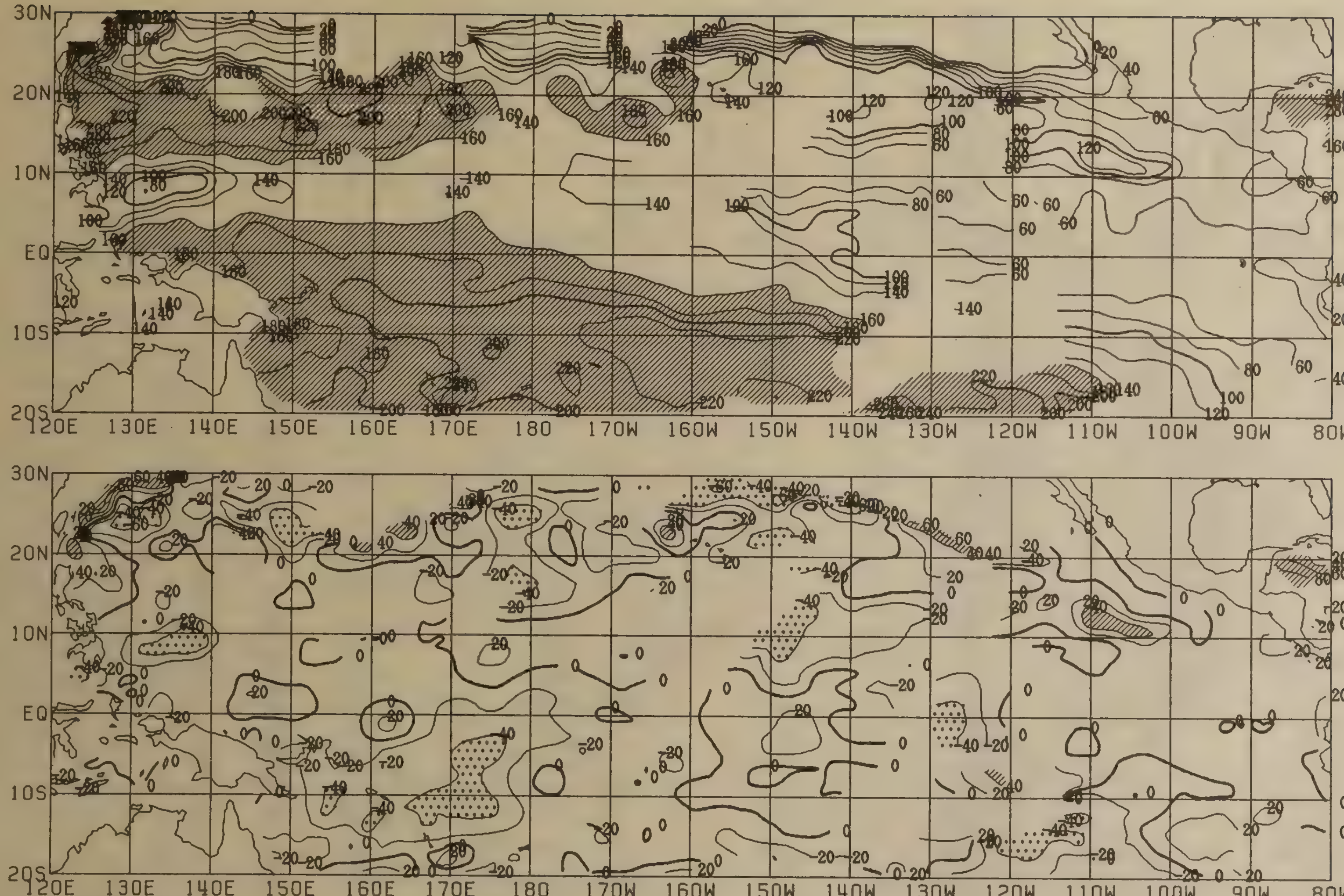
Table 1(b) El Niño monitoring indices (continued).
Data source for these atmospheric conditions is the Long-range Forecast Division, JMA.



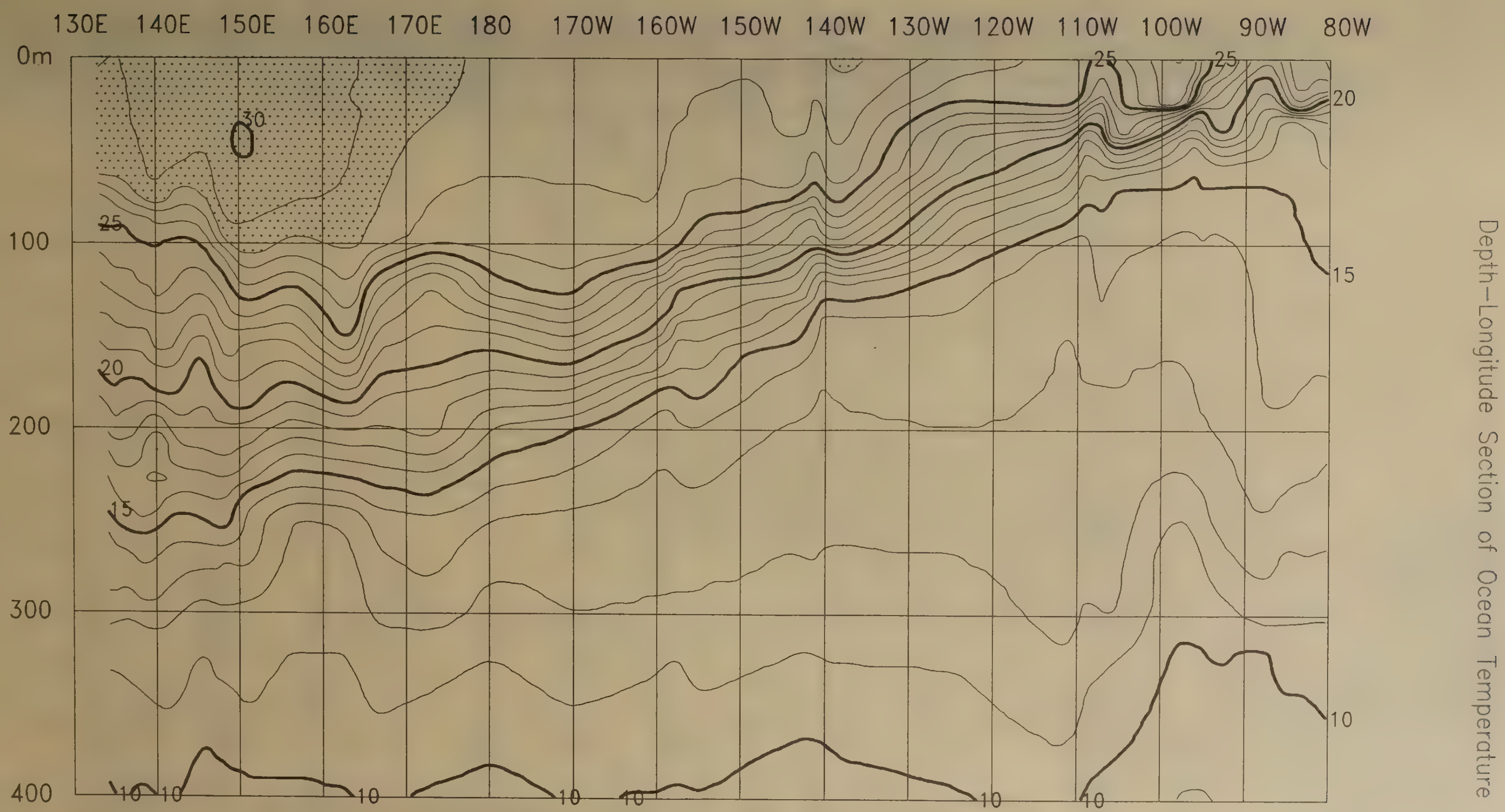
第１図　全球月平均海面水温図（上）及び偏差図（下）（1994年 4月）

Fig.1　Monthly mean sea surface temperature in the global ocean (top) and anomalies (bottom) for APR 1994. Anomalies are computed with respect to the JMA climatology (1961−90) (Climatic charts of sea surface temperatures of the western North Pacific and the global ocean, March 1991). The Contour interval is 1°C and additional anomaly contours of ±0.5°C are shown as broken lines. Negative anomalies are stippled.

Depth of 20° C & Anomalies in the Pacific Ocean

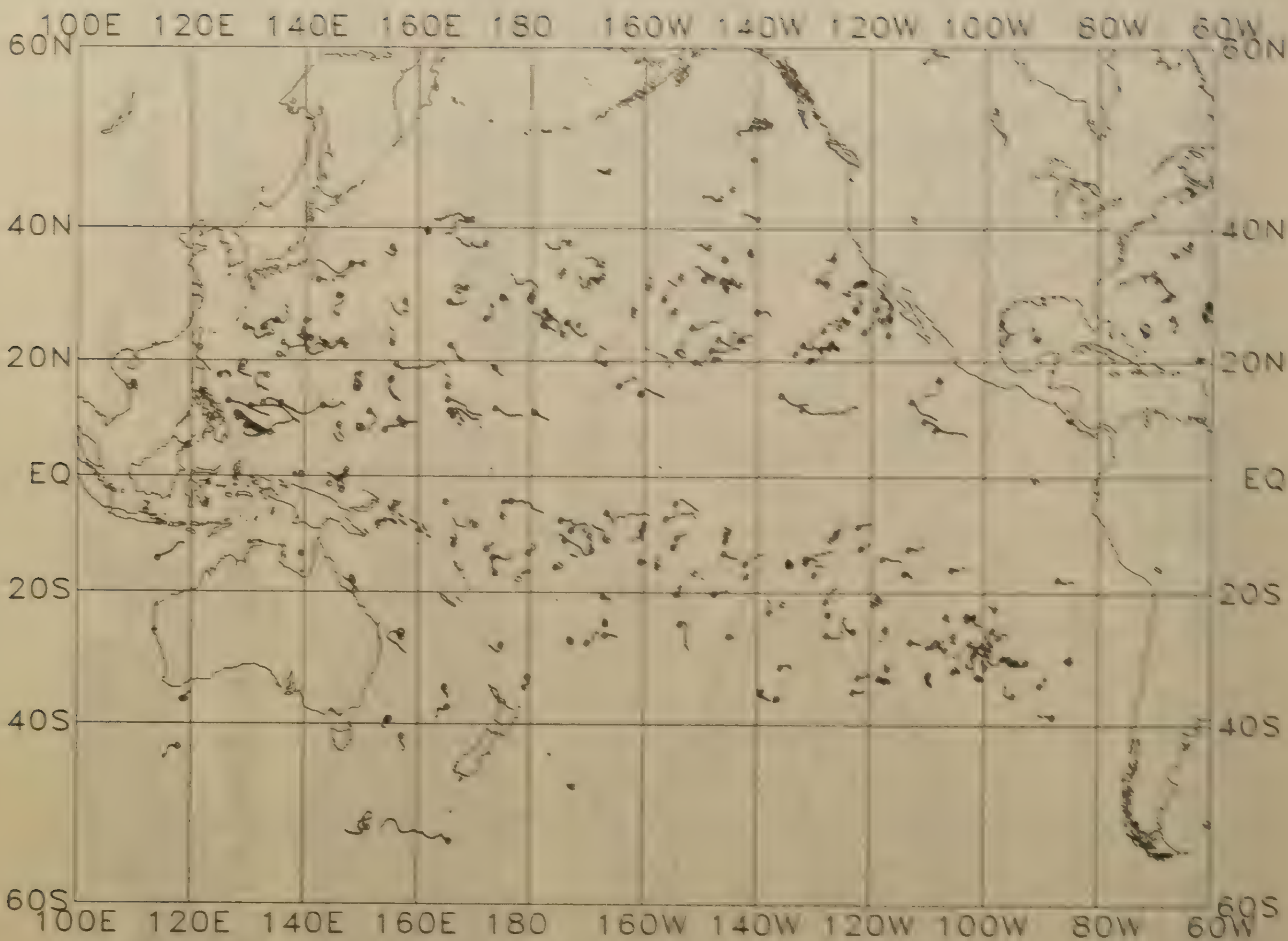


第2図　太平洋表層水温（20℃深度）図（上）及び偏差図（下）（1994年 4月）
Fig.2　The depth of a 20° C isotherm in the Pacific Ocean (top) and anomalies (bottom) for APR 1994.　Anomalies are computed with respect to the climatology (Levitus, 1982, Climatological Atlas of the World Ocean, NOAA).
The contour interval is 20m with shading for values greater than 160m (top), and shading/stippling for values greater/smaller than +40m/−40m (bottom).



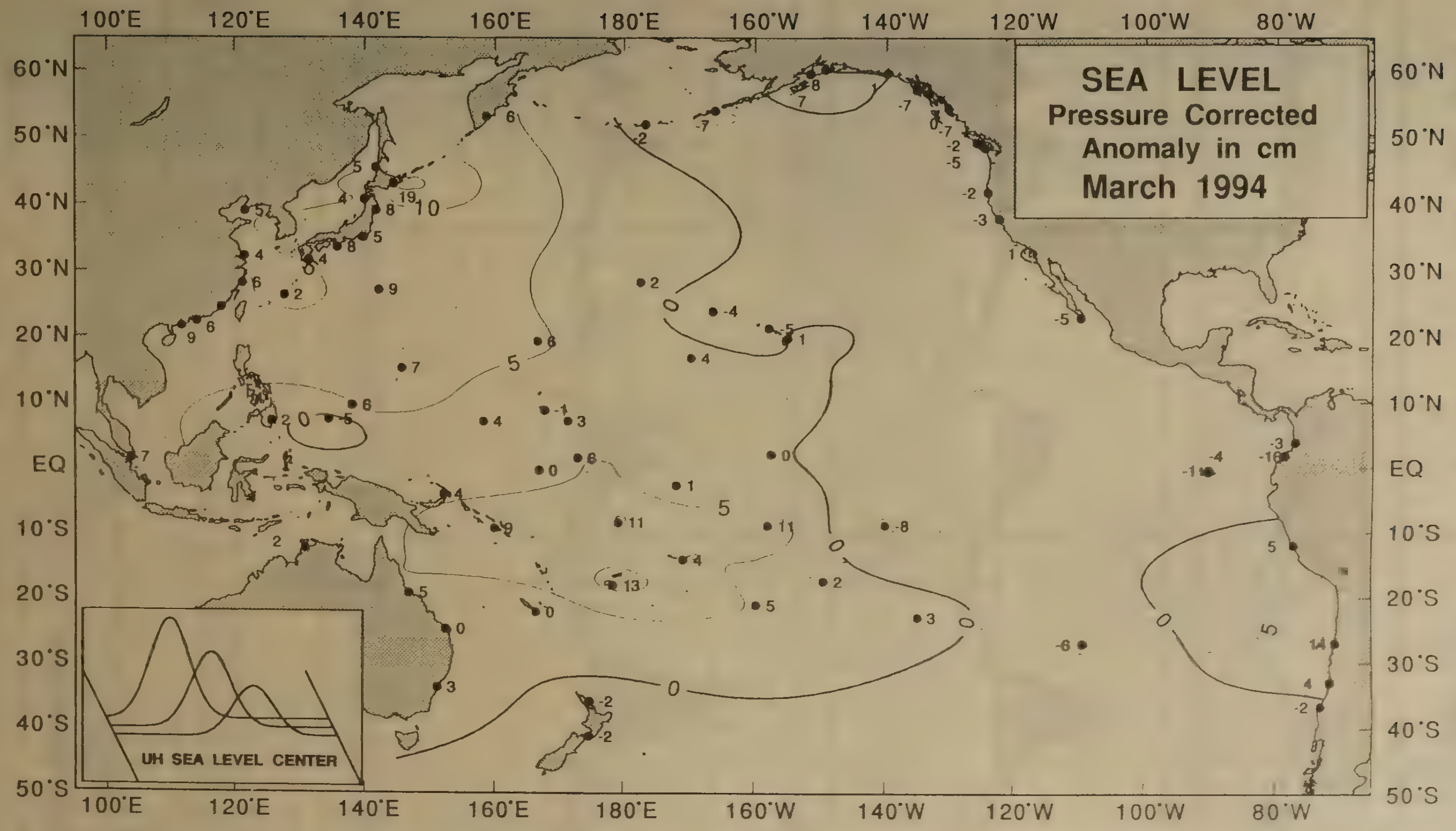
第３図　太平洋赤道に沿う表層水温断面図（1994年 4月）

Fig.3　Depth–longitude section of the Pacific Ocean temperature along the equator for APR 1994. The contour interval is 1° C with spotted shading for values greater than 28° C.



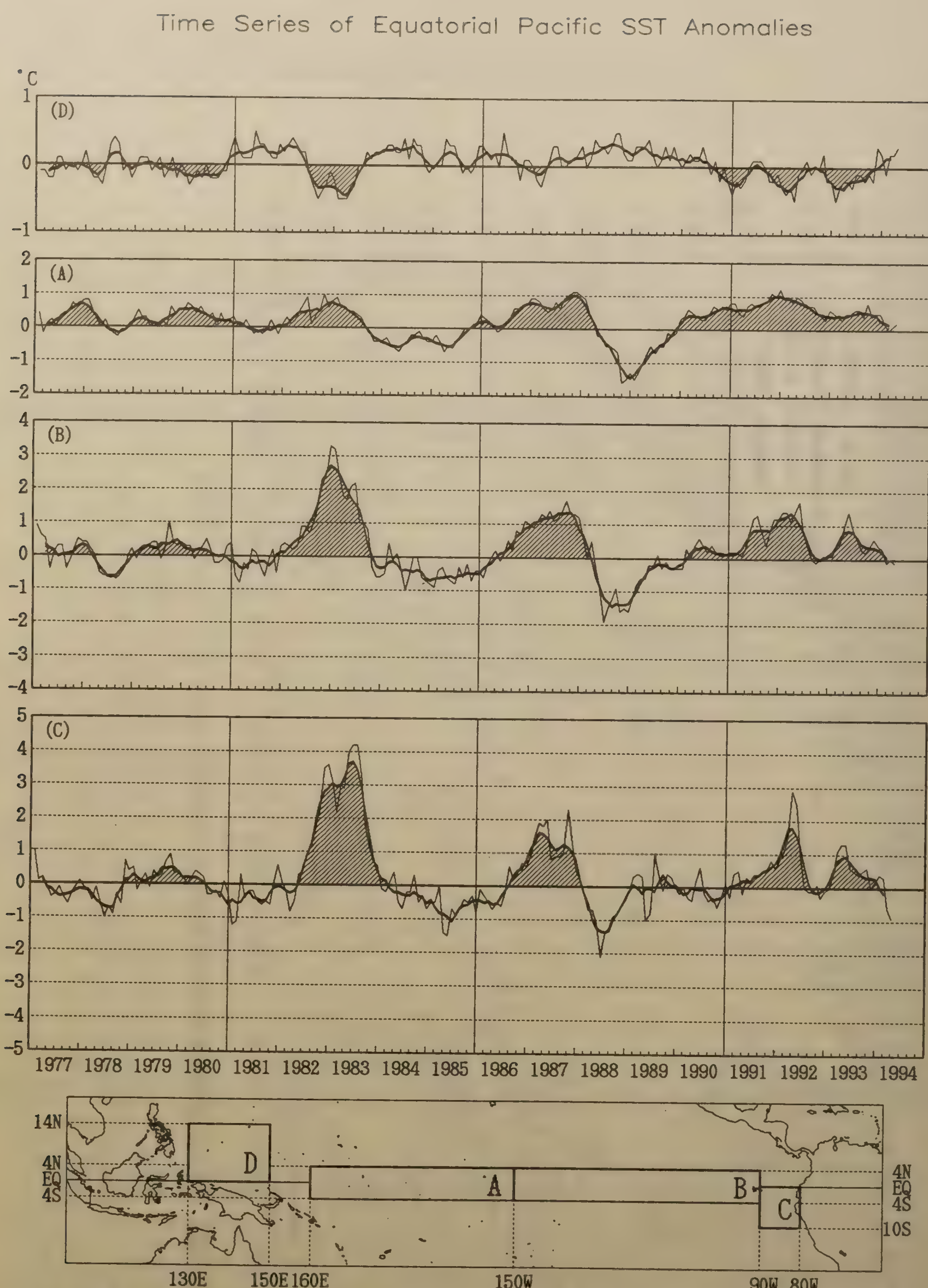
第4図　太平洋ブイ流跡図(1994年 4月)

Fig.4 Movements of drifting buoys in the Pacific Ocean during APR 1994. Each track is one buoy, with the small circle representing the buoy's last position for the month.



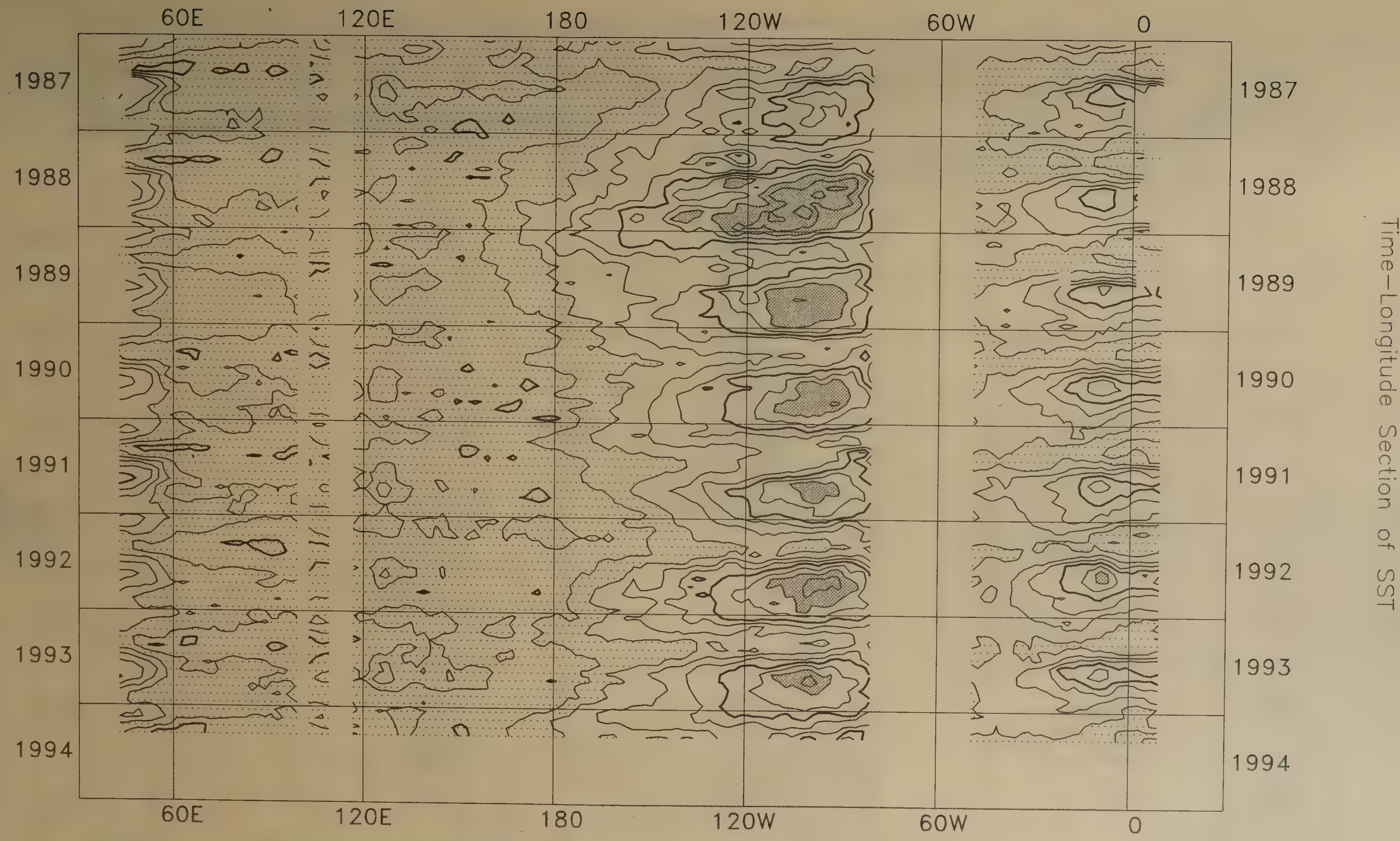
第5図　太平洋海面水位偏差図（ 1994年 3月 ）

Fig.5　Sea level anomalies obtained from the 1975 to 1986 mean MAR sea level adjusted for atmospheric pressure (MAR 1994).
This figure is prepared by the SOC of ISLP-PAC, Dept. of Oceanography, Univ. of Hawaii.



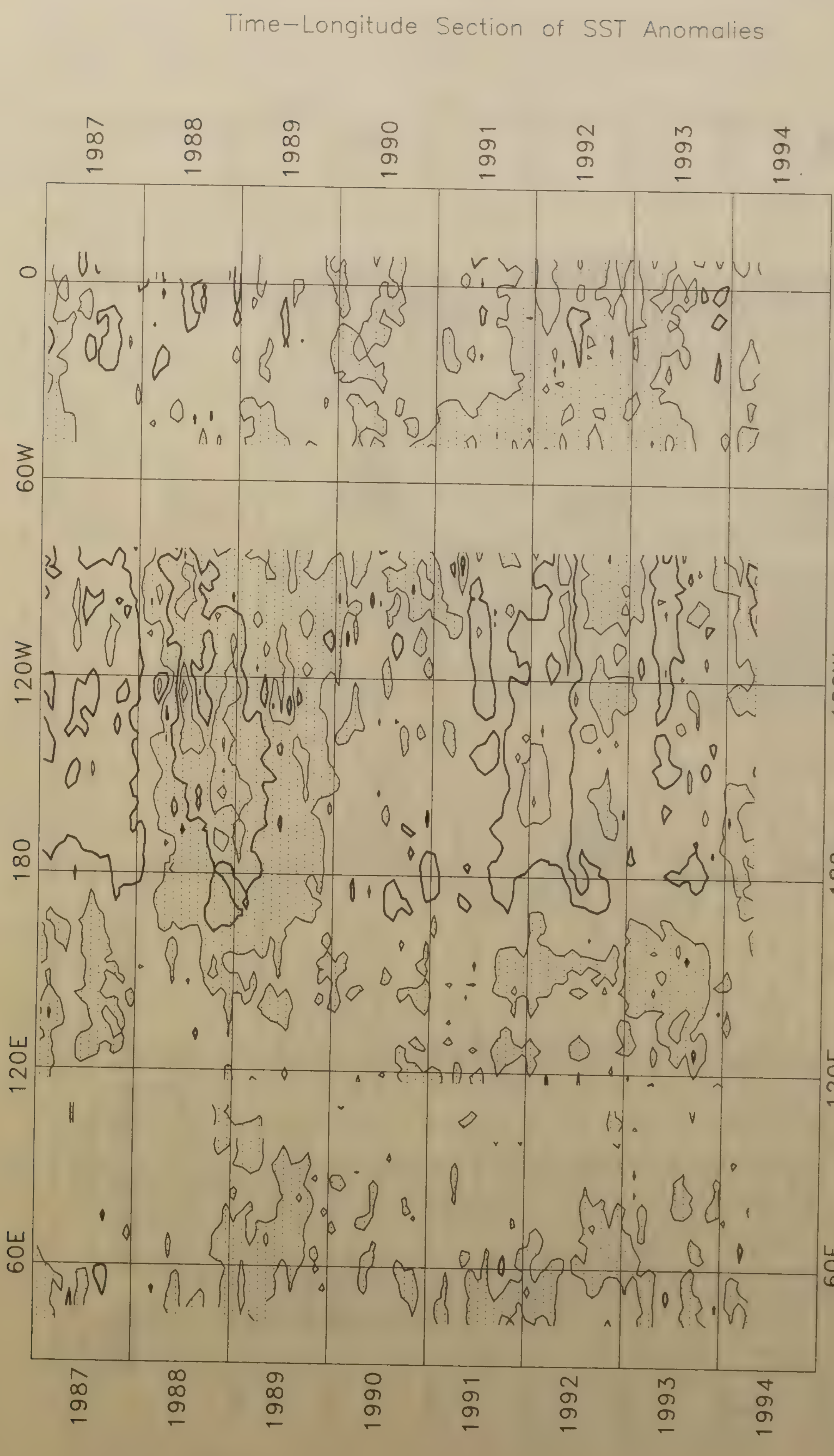
第６図　赤道太平洋海面水温偏差時系列図

Fig.6 Time series of monthly mean SST anomalies in the equotorial Pacific Ocean for the areas indicated at the bottom of the figure. Thin lines show the monthly values and thick lines their 5 month running mean. Positve anomalies (A,B,C) and negative anomalies (D) are shaded. Anomalies are computed with respect to the JMA climatology (1961–90).



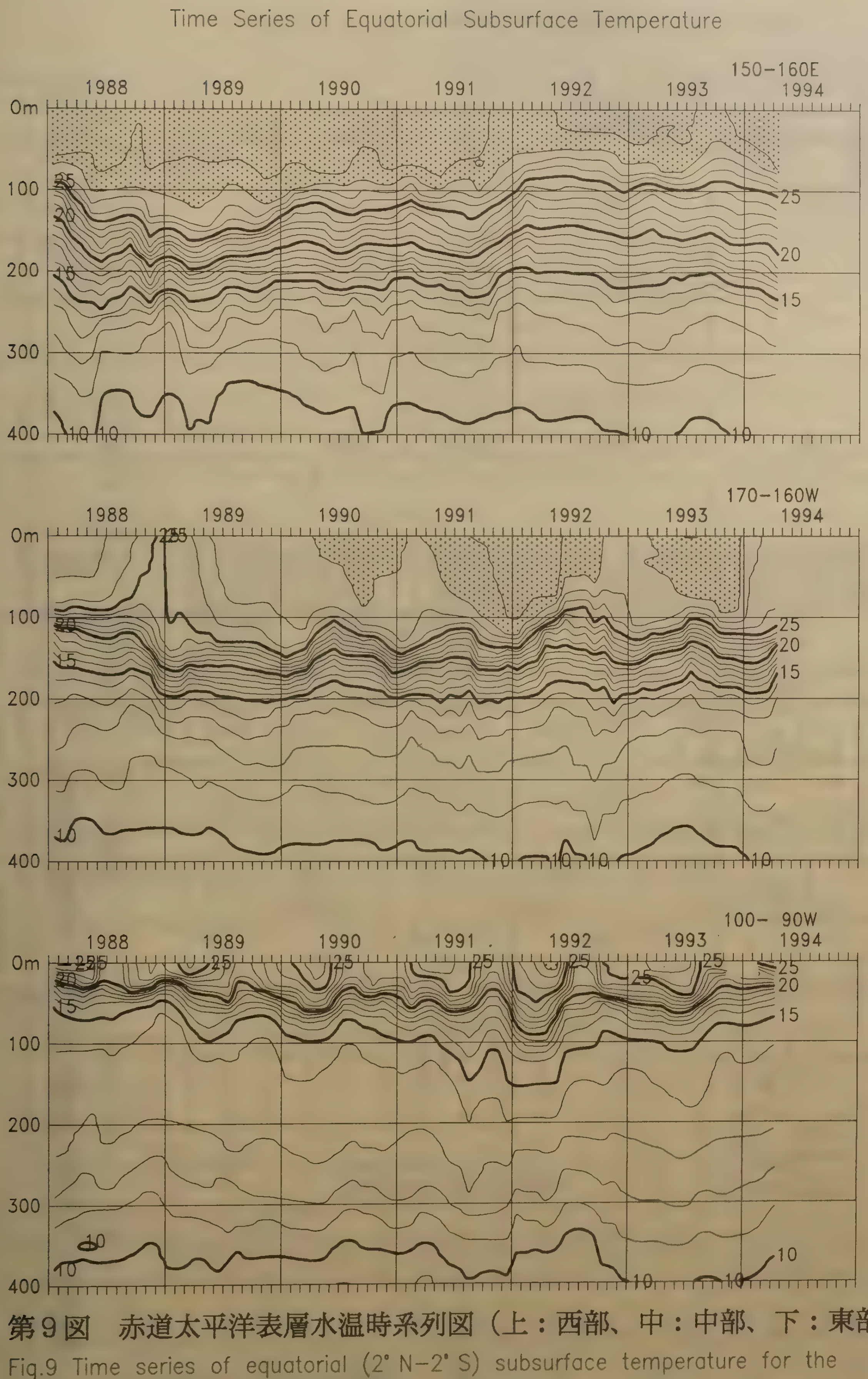
第7図　赤道に沿う海面水温時系列図

Fig.7 Time–longitude section of SSTs along the equator (2° N–2° S) in the global ocean. The contour interval is 1° C, with thick contour lines at 25 and 30° C. SST values greater than 28° C are spotted and values less than 23° C are shaded.



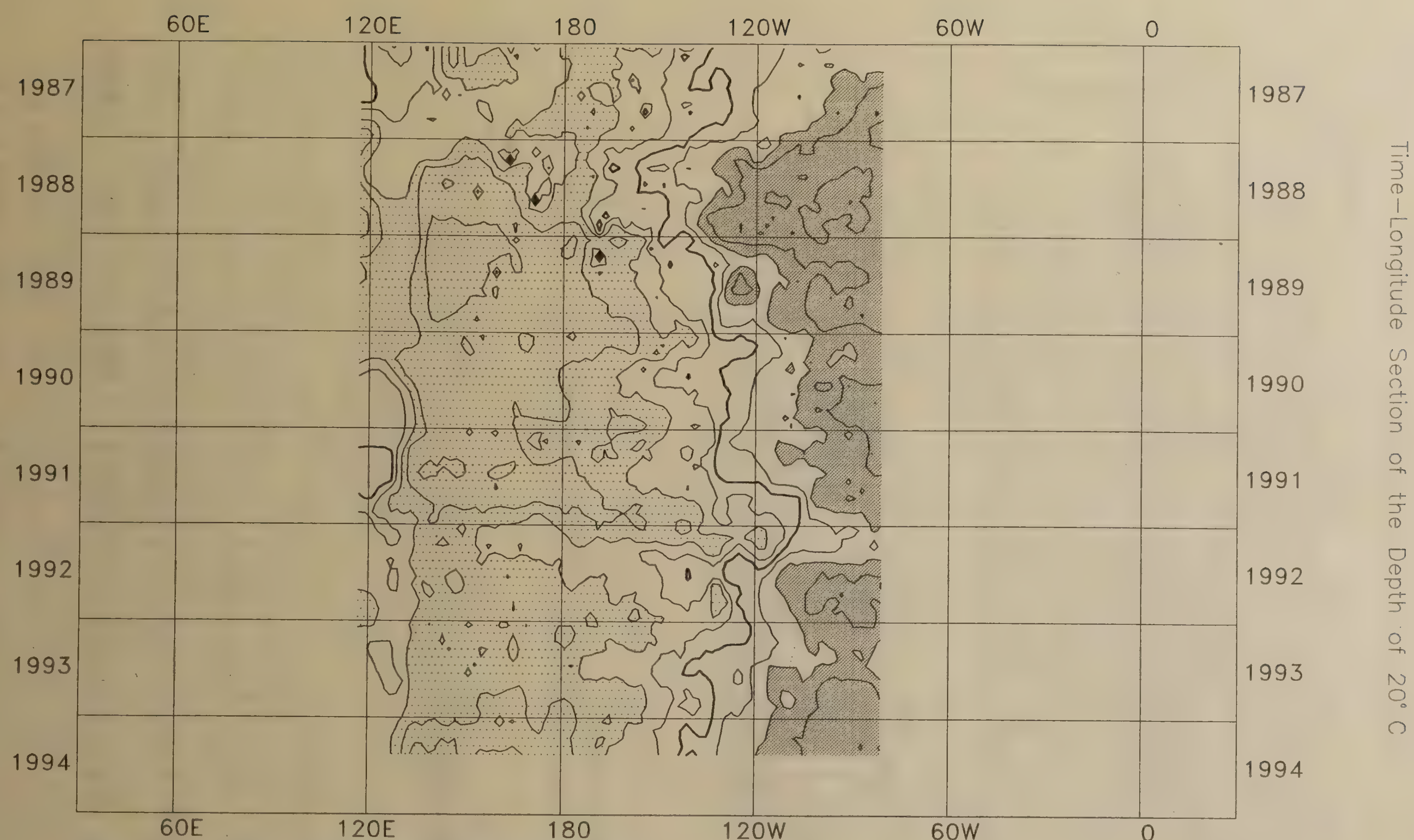
第8図　赤道に沿う海面水温偏差時系列図

Fig.8 Time-longitude section of SST anomalies along the equator (2° N–2° S) based on the JMA climatology (1961–1990). The contour interval is 1° C, with thick contour lines at +1° C and −1° C. Negative anomalies are spotted.



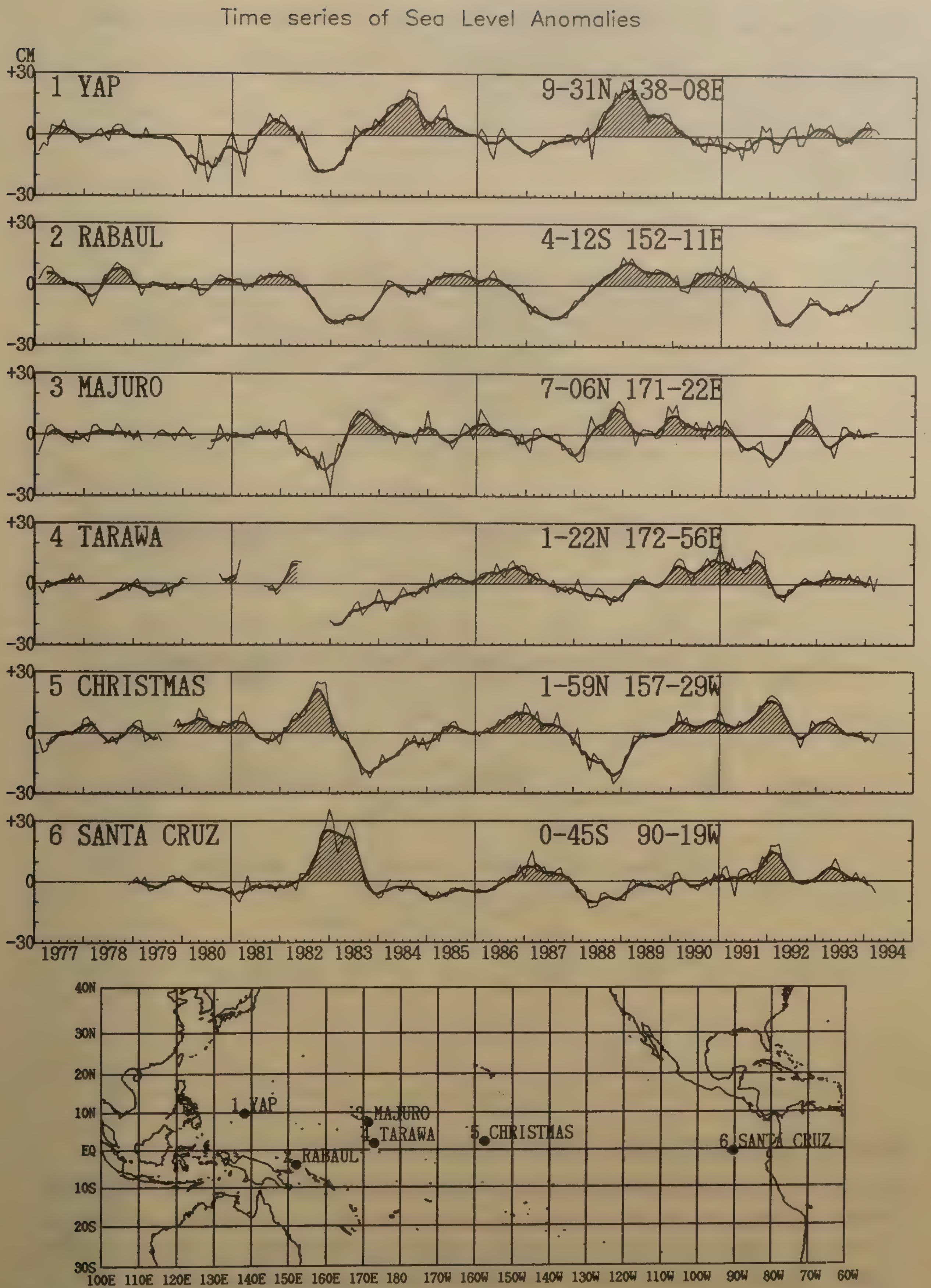
第９図　赤道太平洋表層水温時系列図（上：西部、中：中部、下：東部）

Fig.9 Time series of equatorial (2°N-2°S) subsurface temperature for the western Pacific (top, 150-160°E), the central Pacific (middle, 170-160°W) and the eastern Pacific (bottom, 100-90°W). The contour interval is 1°C with spotted shading for the values greater than 28°C.



第10図　太平洋の赤道に沿う20℃深度時系列図

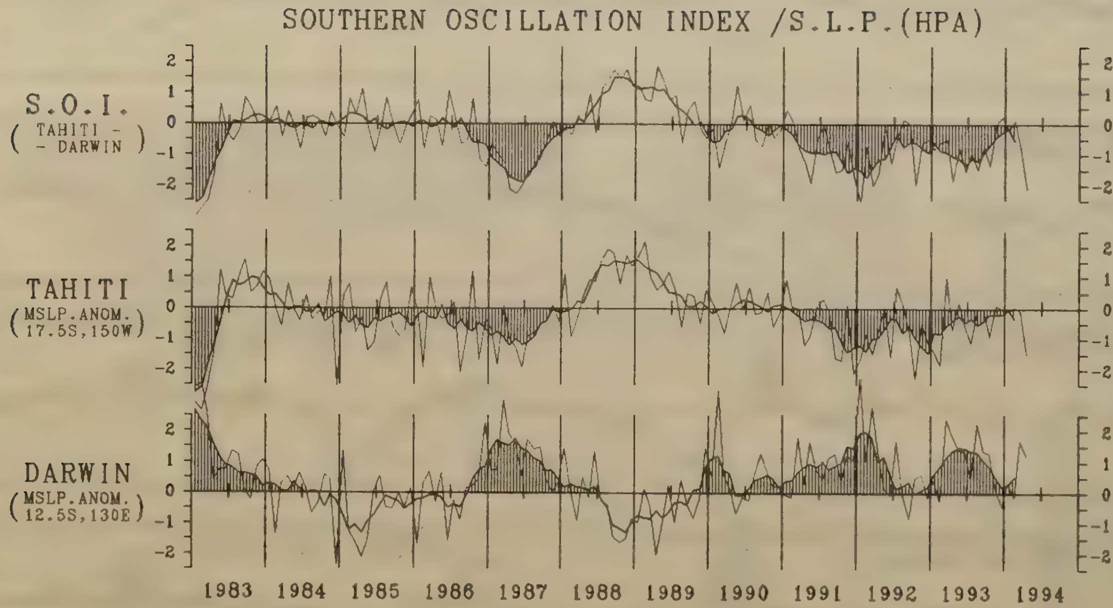
Fig.10 Time–longitude section of the depth of a 20° C isotherm along the equator in the Pacific Ocean. The contour interval is 20m with thick contour lines at 100m. Values shallower than 60m are shaded and those deeper than 140m are stippled.



第11図　太平洋月平均海面水位偏差時系列図

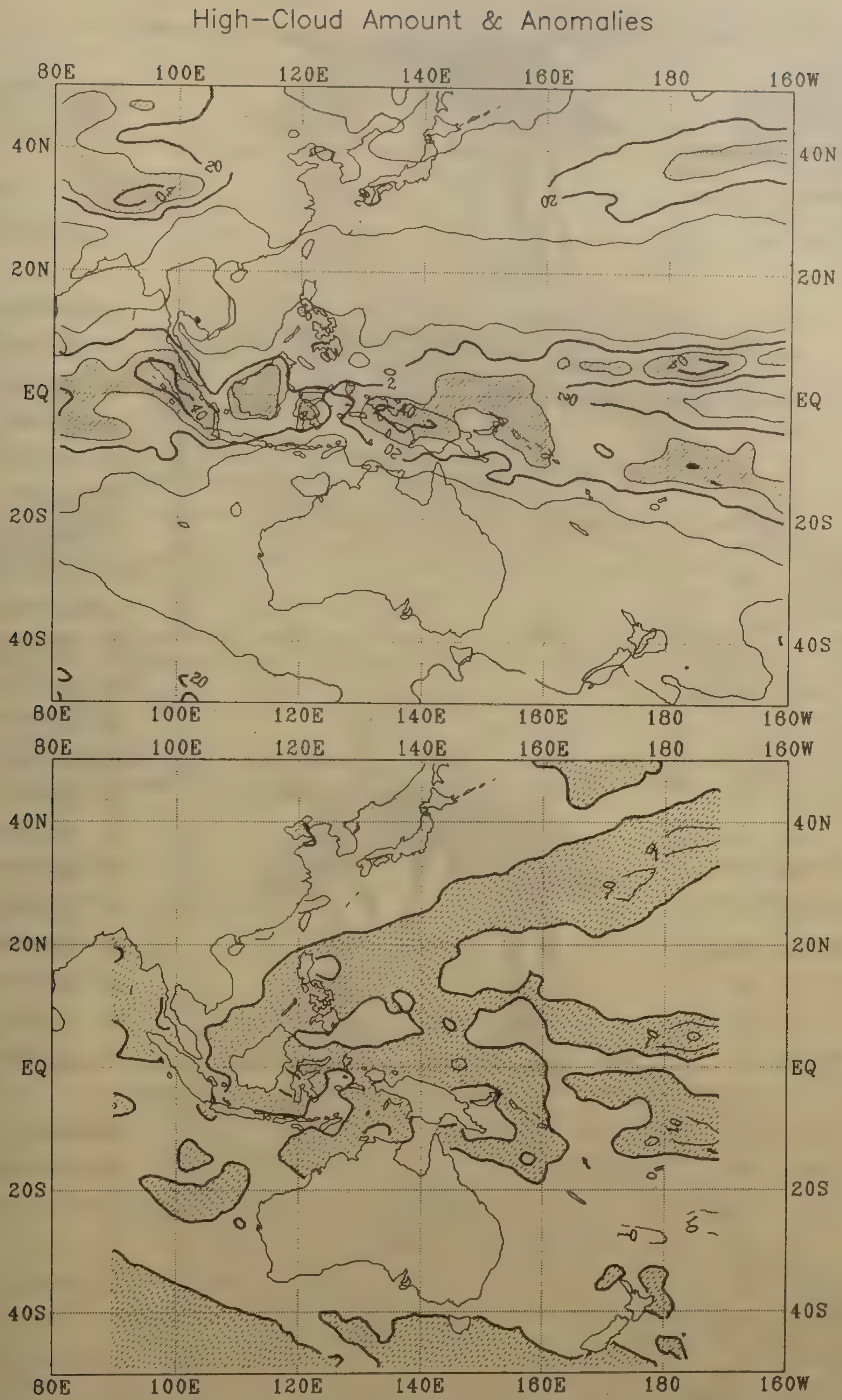
Fig.11 Time series of sea level anomalies based on 1976 to 1990 monthly mean sea level obtained from the stations indicated at the bottom of the figure. Thin lines show the monthly mean and thick lines show their 5 month running mean. Positive anomalies are shaded.

Time series of SOI & Sea Level Pressure Standardized Anomalies



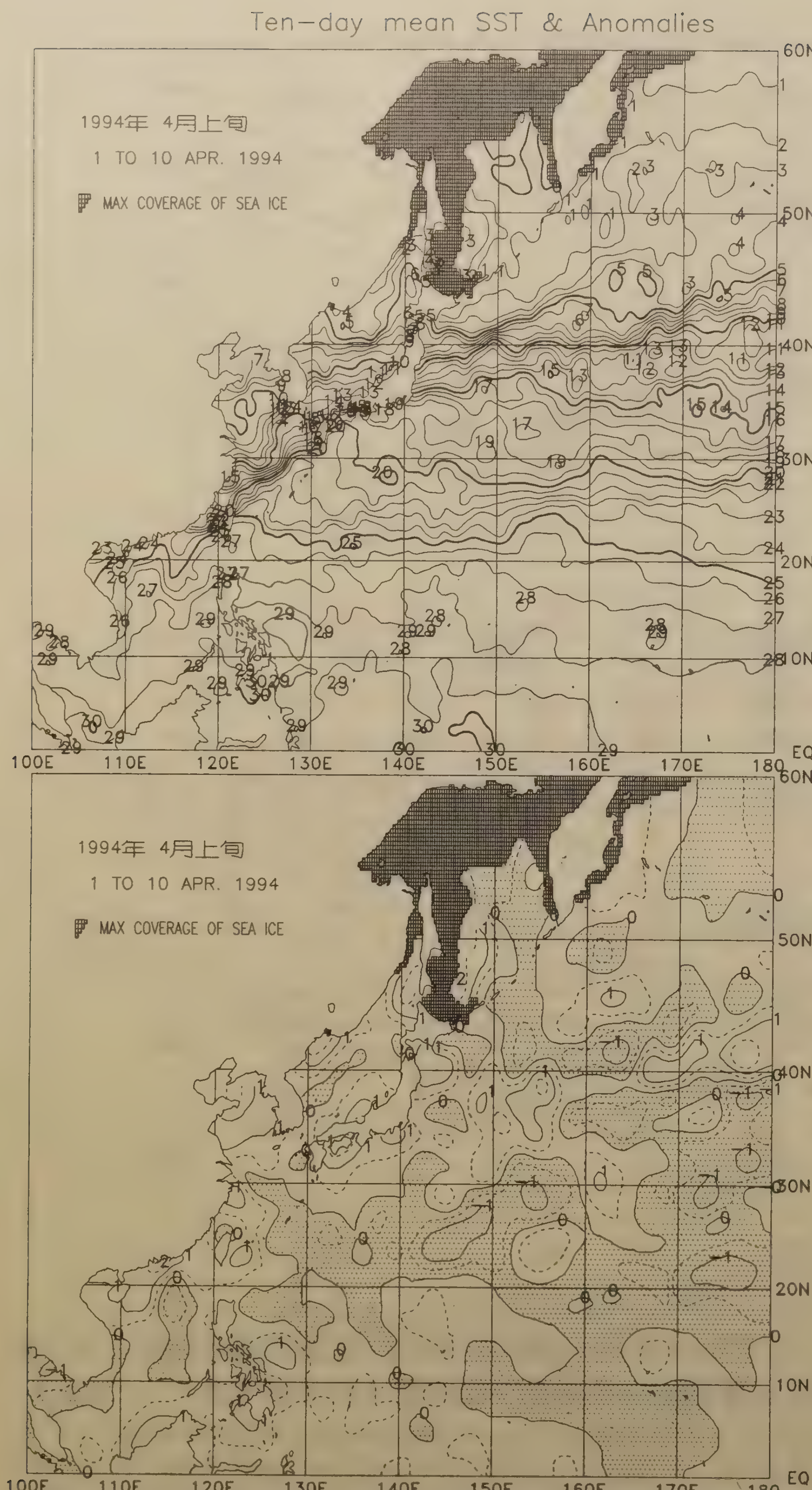
第12図　南方振動指数及び海面気圧偏差時系列図

Fig.12 The Southern Oscillation Index (top) and monthly mean sea level pressure standardized anomalies at Tahiti (middle) and Darwin (bottom). Thin lines show the monthly mean and thick lines their 5 month running mean. Negative values (top, middle) and positive values (bottom) are shaded. Base periods for normals and standard deviations are 1961−1990. This figure is prepared by the Long−range Forecast Division, JMA.



第13図　月平均上層雲量分布図及び偏差図（1994年 4月）

Fig.13 Monthly mean of the high-cloud amount (%, top) and its anomalies (%, bottom) in the equatorial Pacific for APR 1994. The contour interval is 10%. Areas above 30% are shaded (top) and positive anomalies are stippled (bottom). Anomalies represent a departure from the 1978-1990 base period monthly means. This figure is prepared by the Long-range Forecast Division, JMA.



旬平均沿岸水温(℃)
Coastal Water Temperature

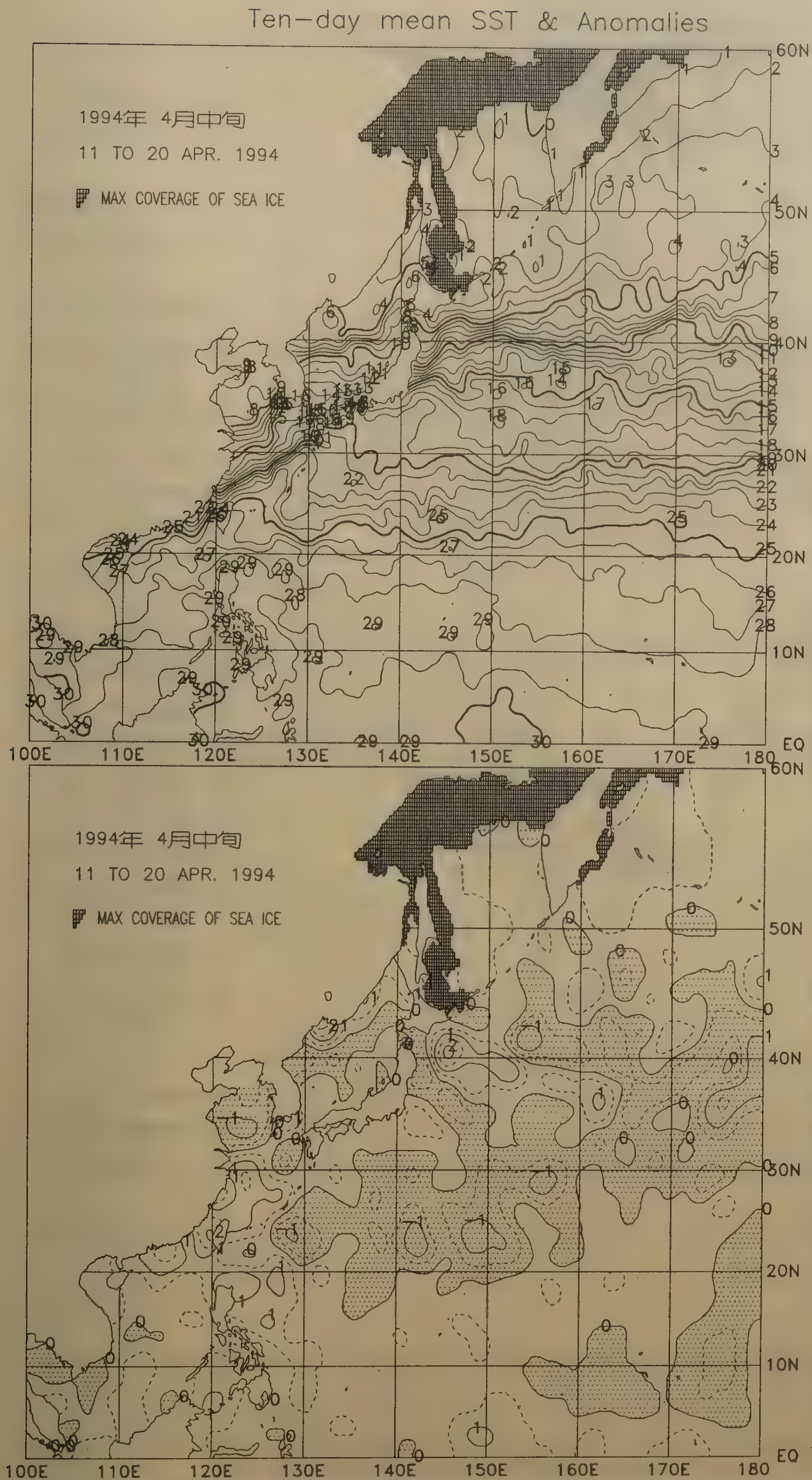
地名 (Index Number)	水温 Temp.	偏差 Anom.
石垣島(47918)	24.4	+1.3
那　覇(47936)	22.3	+0.8
名　瀬(47909)	-	-
足摺岬(47898)	18.0	+0.9
潮　岬(47778)	18.9	-
御前崎(47655)	14.9	+0.7
八丈島(47678)	18.9	+0.8
館　山(47672)	16.5	+1.8
小名浜(47598)	9.4	-0.1
宮　古(47585)	6.8	+0.7
浦　河(47426)	2.3	+0.5
紋　別(47435)	0.8	-
稚　内(47401)	4.0	-
寿　都(47421)	5.9	-
江　差(47428)	6.8	-
飛　島(47587)	8.6	-0.9
輪　島(47600)	10.6	+0.2
西　郷(47740)	12.8	-
浜　田(47755)	13.9	-
厳　原(47800)	14.6	-
牛　深(47838)	16.3	-

海洋気象ブイロボット
旬平均海面水温(℃)
Ocean Data Buoy SST

日本海	37.9N,134.5E	10.2
四国沖	29.0N,135.0E	20.7
東シナ海	28.2N,126.3E	20.8

第14図 北西太平洋旬平均海面水温図(上)及び偏差図(下)(1994年 4月上旬)

Fig.14 Ten-day mean SSTs in the western North Pacific (top) and anomalies (bottom) for the 1st ten-day period in APR 1994. Anomalies are computed with respect to the JMA climatology (1961-90). The contour interval is 1°C and additional anomaly contours of 0.5°C are shown. Negative anomalies are stippled.



旬平均沿岸水温(℃)
Coastal Water Temperature

地名 (Index Number)	水温 Temp.	偏差 Anom.
石垣島(47918)	25.2	+1.4
那　覇(47936)	22.9	+0.9
名　瀬(47909)	-	-
足摺岬(47898)	18.2	+0.4
潮　岬(47778)	19.1	-
御前崎(47655)	15.9	+0.6
八丈島(47678)	19.7	+0.8
館　山(47672)	17.1	+1.8
小名浜(47598)	10.7	+0.3
宮　古(47585)	7.5	+1.0
浦　河(47426)	2.8	-0.2
紋　別(47435)	3.6	-
稚　内(47401)	5.3	-
寿　都(47421)	7.3	-
江　差(47428)	7.4	-
飛　島(47587)	10.7	+0.4
輪　島(47600)	12.2	+0.3
西　郷(47740)	13.1	-
浜　田(47755)	14.6	-
厳　原(47800)	15.0	-
牛　深(47838)	17.2	-

海洋気象ブイロボット
旬平均海面水温(℃)
Ocean Data Buoy SST

地点	位置	SST
日本海	37.9N,134.5E	9.5
四国沖	29.0N,135.0E	20.7
東シナ海	28.2N,126.3E	23.9

第15図 北西太平洋旬平均海面水温図(上)及び偏差図(下)(1994年 4月中旬)

Fig.15 Ten-day mean SSTs in the western North Pacific (top) and anomalies (bottom) for the 2nd ten-day period in APR 1994. Anomalies are computed with respect to the JMA climatology (1961-90). The contour interval is 1° C and additional anomaly contours of 0.5° C are shown. Negative anomalies are stippled.

Ten-day mean SST & Anomalies



旬平均沿岸水温(℃)
Coastal Water Temperature

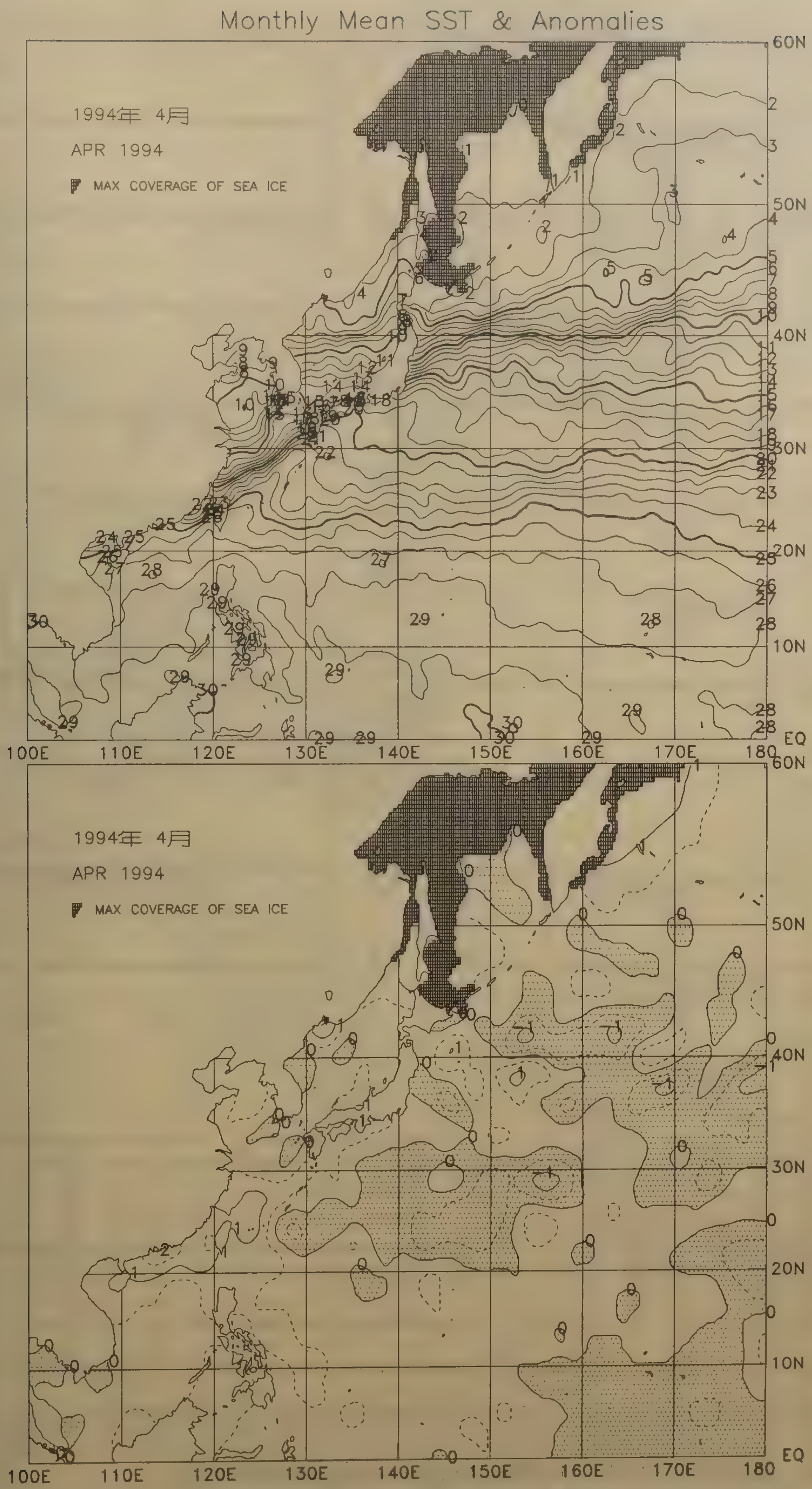
地名 (Index Number)	水温 Temp.	偏差 Anom.
石垣島(47918)	26.4	+1.7
那 覇(47936)	23.9	+1.4
名 瀬(47909)	-	-
足摺岬(47898)	18.5	+0.1
潮 岬(47778)	20.6	-
御前崎(47655)	17.4	+1.0
八丈島(47678)	19.7	+0.5
館 山(47672)	17.4	+1.4
小名浜(47598)	12.6	+1.7
宮 古(47585)	8.3	+1.2
浦 河(47426)	4.2	+0.5
紋 別(47435)	6.5	-
稚 内(47401)	6.7	-
寿 都(47421)	8.5	-
江 差(47428)	8.8	-
飛 島(47587)	11.8	+0.6
輪 島(47600)	14.3	+1.0
西 郷(47740)	14.6	-
浜 田(47755)	15.8	-
厳 原(47800)	15.6	-
牛 深(47838)	18.0	-

海洋気象ブイロボット
旬平均海面水温(℃)
Ocean Data Buoy SST

日本海	37.9N,134.5E	11.1
四国沖	29.0N,135.0E	21.0
東シナ海	28.2N,126.3E	23.4

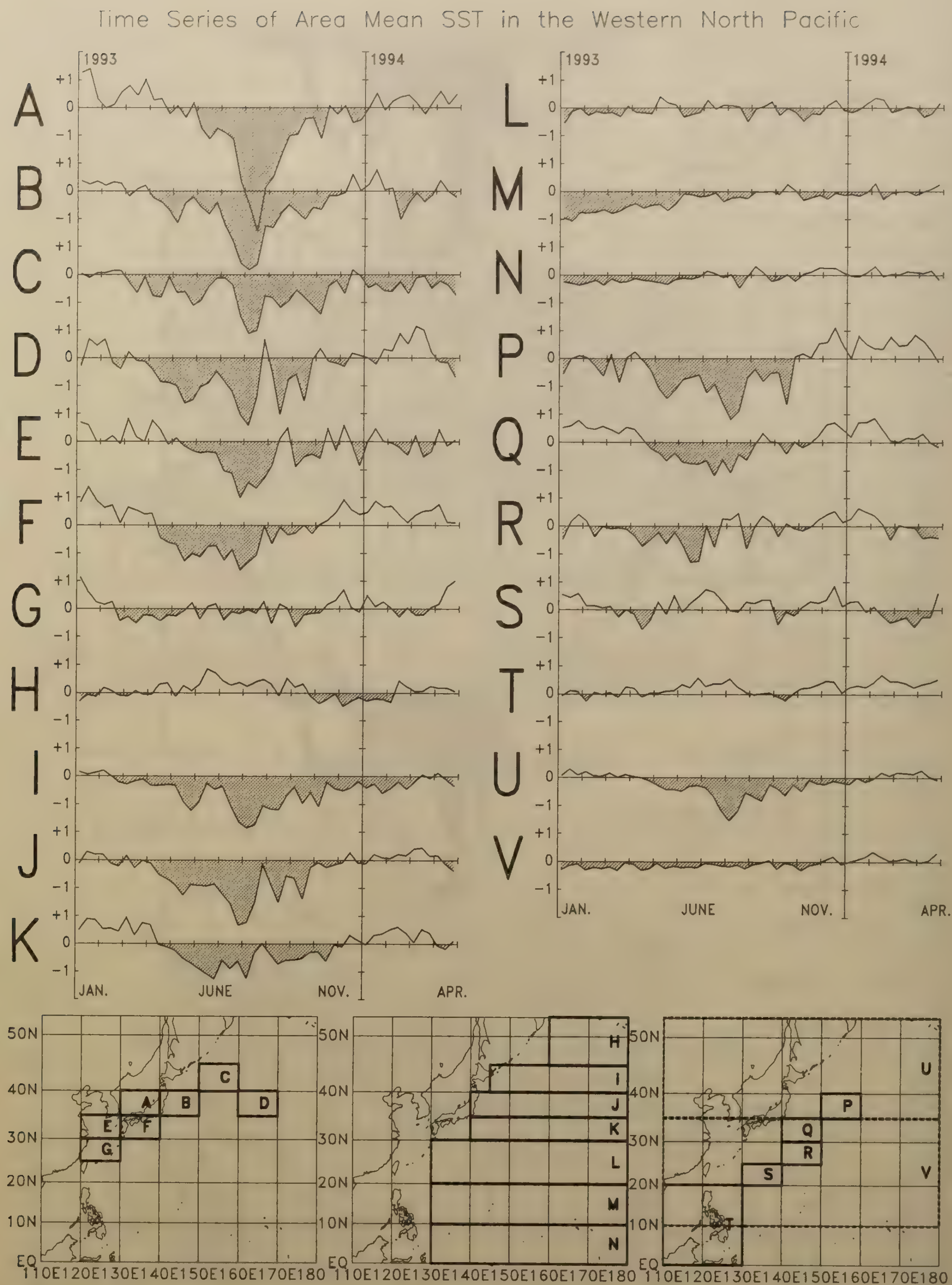
第16図 北西太平洋旬平均海面水温図(上)及び偏差図(下)(1994年 4月下旬)

Fig.16 Ten-day mean SSTs in the western North Pacific (top) and anomalies (bottom) for the 3rd ten-day period in APR 1994. Anomalies are computed with respect to the JMA climatology (1961-90). The contour interval is 1° C and additional anomaly contours of 0.5° C are shown. Negative anomalies are stippled.



第17図 北西太平洋月平均海面水温図(上)及び偏差図(下)(1994年 4月)

Fig.17 Monthly mean SSTs in the western North Pacific (top) and anomalies (bottom) for APR 1994. Anomalies are computed with respect to the JMA climatology (1961–90). The contour interval is 1° C and additional anomaly contours of 0.5° C are shown. Negative anomalies are stippled.



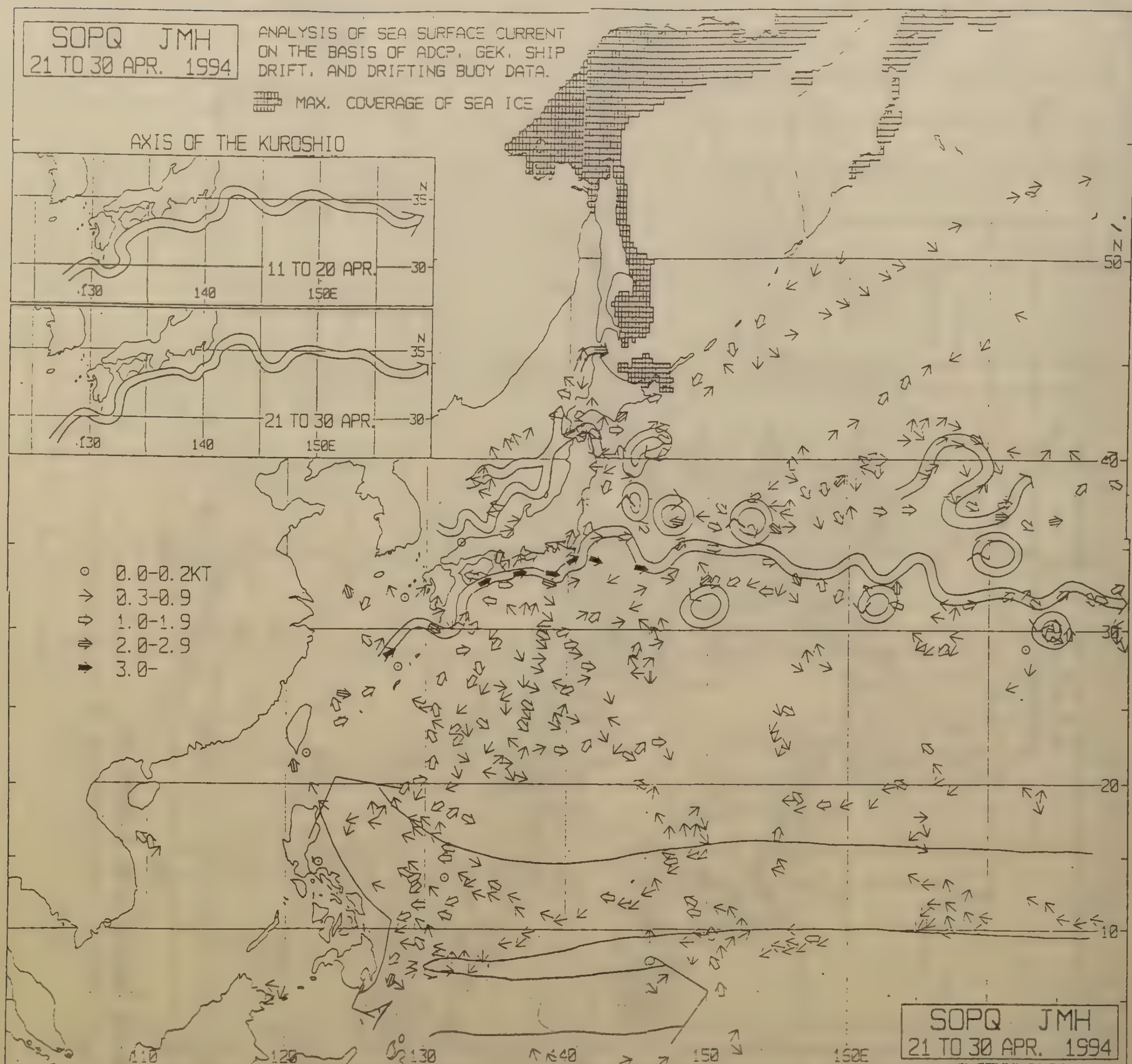
第18図　北西太平洋旬平均海面水温平年偏差時系列図

Fig.18 Time series of the ten-day mean sea surface temperature anomalies (° C) in the western North Pacific for the areas indicated at the bottom. Negative anomalies are shaded. Anomalies are computed with respect to the JMA climatology (1961–90).



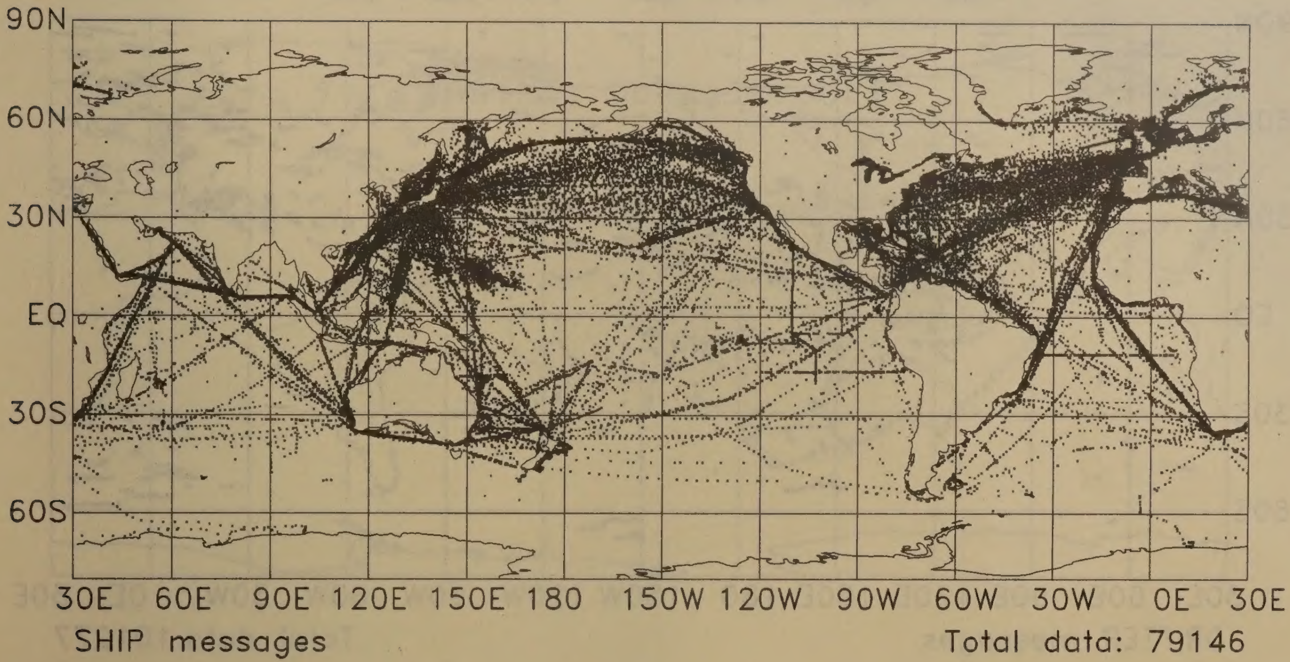
第19図 日本近海表層水温（深さ100M）図（1994年 4月）

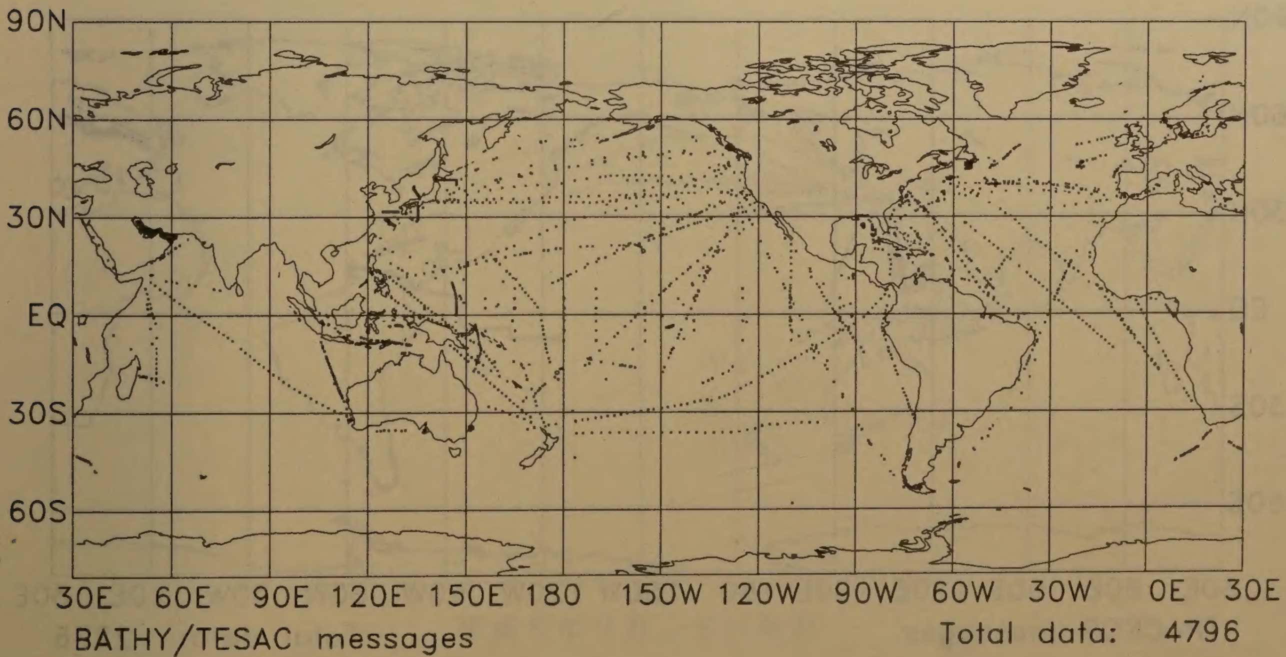
Fig.19 Subsurface (100m) temperatures in seas adjacent to Japan for APR 1994.



第20図　北西太平洋旬平均海流図（1994年 4月下旬）

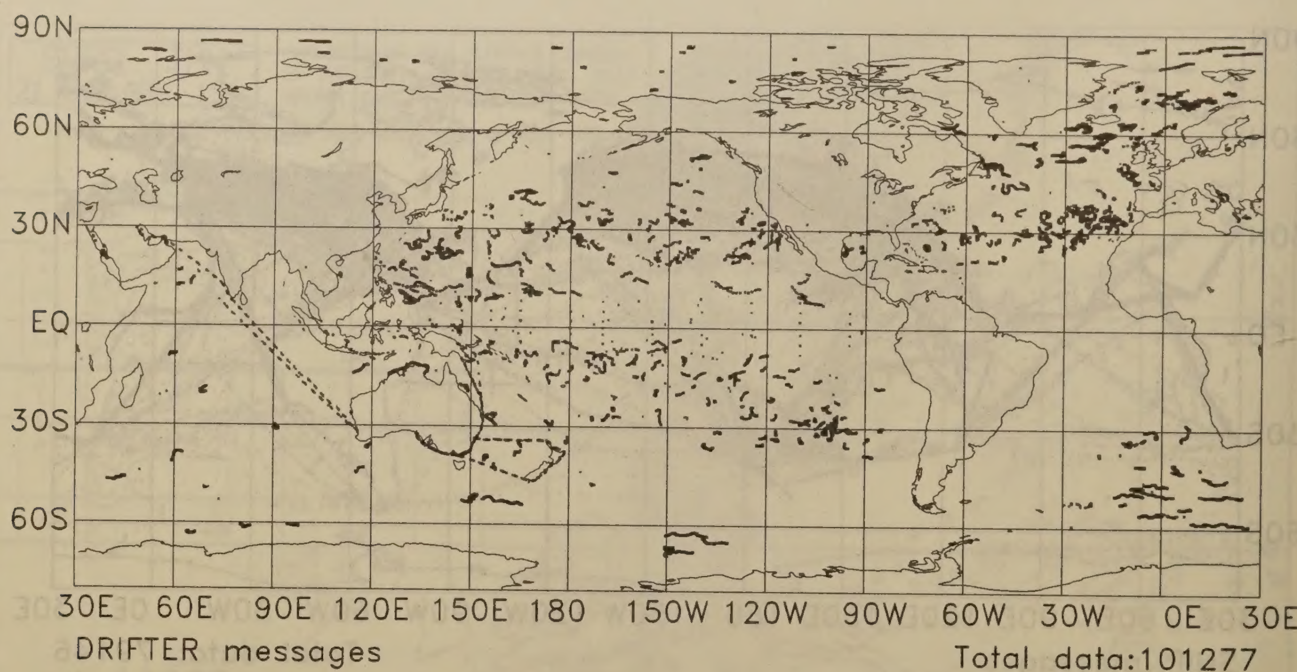
Fig.20 Ten-day analysis of the sea surface current in the western North Pacific for the 3rd ten-day period in APR 1994. Small arrows indicate sea surface currents measured with acoustic Doppler current profilers, GEKs deployed in research vessels, and ship drift by merchant ships/drifting buoys during the month. Major currents such as the Kuroshio and the North Equatorial Current are denoted by larger open arrows.

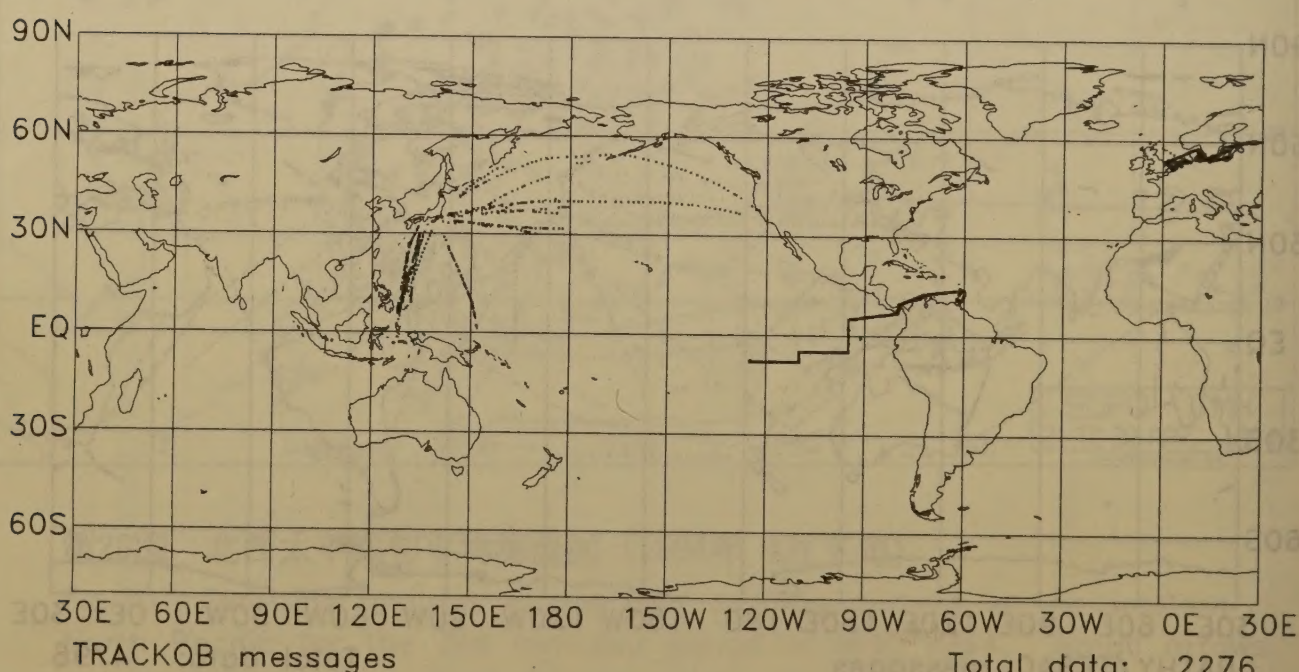




第21-1図　測点分布図(1994年 4月)

Fig.21－1　Geographical distribution of SHIP messages (SST data, top) and BATHY/TESAC messages (subsurface temperature data, bottom) for APR 1994.





第21-2図　測点分布図(1994年 4月)

Fig.21-2 Geographical distribution of DRIFTER messages (buoy drift and SST data, top) and TRACKOB messages (ship drift and SST data, bottom) for APR 1994.

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